

CLAIMS.

We claim:

- 5 1. An ethylene interpolymer composition having
 - i) a number average molecular weight (M_n) of from 1,000 to 9,000; and
 - ii) a Brookfield Viscosity (measured at 149°C/300°F) of from 500 to 9,000 cP;and wherein when one or more tackifiers are added in an amount of from 15 to 40 percent by weight (based on the combined weight of interpolymer composition and
10 tackifier) to said ethylene interpolymer composition, then the resulting adhesive composition has:
 - a) a Brookfield Viscosity (measured at 177°C/350°F) of from 400 to 2,000 cP;
 - b) a Peel Adhesion Failure Temperature (PAFT) of greater than or equal to 110°F; and
 - 15 c) a Shear Adhesion Failure Temperature (SAFT) of greater than or equal to 140°F.
2. The ethylene interpolymer composition of Claim 1 having iii) a density of from 0.88 to 1.06 g/cm³.
- 20 3. The ethylene interpolymer composition of Claim 2 derived from olefinic comonomer reactants comprising at least ethylene and styrene, such composition having iii) a density of from 0.931 to 1.06 g/cm³.
4. The ethylene interpolymer composition of Claim 2 having iii) a density of from
25 0.88 to 0.93 g/cm³.

5. The ethylene interpolymer composition of Claim 4 having
- i) a density of from 0.89 to 0.92 g/cm³;
 - 5 ii) a number average molecular weight (Mn) of from 1250 to 7,000; and
 - iii) a Brookfield Viscosity (measured at 149°C/300°F) of from 1,000 to 6,000 cP;
- and wherein when one or more tackifiers are added in an amount of from 20 to 35 percent by weight (based on the combined weight of interpolymer composition and tackifier) to said ethylene interpolymer composition, then the resulting adhesive
- 10 composition has:
- a) a Brookfield Viscosity (measured at 177°C/350°F) of from 500 to 1,400 cP;
 - b) a Peel Adhesion Failure Temperature (PAFT) of greater than or equal to 115°F;
 - and
 - c) a Shear Adhesion Failure Temperature (SAFT) of greater than or equal to 150°F;
 - 15 and
 - d) 100% paper tear from 35 to 140°F.
6. The ethylene interpolymer composition of Claim 4 having;
- i) a density of from 0.895 to 0.915 g/cm³;
 - 20 ii) a number average molecular weight (Mn) of from 1500 to 6,000; and
 - iii) a Brookfield Viscosity (measured at 149°C/300°F) of from 1,500 to 5,000 cP;
- and wherein when one or more tackifiers are added in an amount of from 20 to 35 percent by weight (based on the combined weight of interpolymer composition and tackifier) to said ethylene interpolymer composition, then the resulting adhesive
- 25 composition has:
- a) a Brookfield Viscosity (measured at 177°C/350°F) of from 750 to 1,200 cP;
 - b) a Peel Adhesion Failure Temperature (PAFT) of greater than or equal to 120°F;
 - and
 - c) a Shear Adhesion Failure Temperature (SAFT) of greater than or equal to 170°F;
 - 30 and
 - d) a 100% paper tear from 0 to 140°F.

7. The ethylene interpolymers composition of Claim 4, wherein said interpolymers is a copolymer of ethylene/propylene, ethylene/1-butene, ethylene/4-methyl-1-pentene,
5 ethylene/1-pentene, ethylene/1-hexene or ethylene/1-octene.
8. The ethylene interpolymers composition of Claim 1, further comprising one or more compounds chosen from the group consisting of stabilizers, plasticizers, fillers, antioxidants, preservatives, synergists, dyes and pigments.
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9. A process of making an ethylene interpolymers composition; said process comprising:
- i) contacting one or more olefinic monomers in the presence of at least two catalysts, one having a reactivity ratio r_1^H and the other a reactivity ratio r_1^L ; and
 - 15 ii) effectuating the polymerization of the olefinic monomers in the reactor to obtain an olefin polymer, wherein
 - iii) each of r_1^H and r_1^L is from 1 to 200, and r_1^H / r_1^L , is from 0.03 to 30, and/or
 - iv) one catalyst is capable of producing a first polymer with a high molecular weight (M_{WH}) from the monomers under selected polymerization conditions, and
 - 20 the other catalyst is capable of producing a second polymer with, relative to the first polymer, a low molecular weight (M_{WL}) from the same monomers under substantially the same polymerization conditions, where M_{WH}/M_{WL} is from 1 to 20,
10. The process of Claim 9 wherein the catalysts are single site catalysts.
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11. The process of Claim 9 wherein the catalysts are metallocene catalysts.
12. The process of Claim 11 wherein at least one of the metallocene catalysts is a constrained geometry catalyst.

13. The process of Claim 12 wherein said at least one constrained geometry catalyst is $(C_5Me_4SiMe_2N^tBu)Ti(\eta^4-1,3\text{-pentadiene})$.

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14. The process of Claim 9 wherein the catalysts are $(C_5Me_4SiMe_2N^tBu)Ti(\eta^4-1,3\text{-pentadiene})$ and $(1H\text{-cyclopenta}[1]\text{-phenanthrene-2-yl})dimethyl(t\text{-butylamido})silanetitanium dimethyl$.

10 15. The process of Claim 9 wherein the catalysts are $(C_5Me_4SiMe_2N^tBu)ZrMe_2$ and $(C_5Me_4SiMe_2N^tBu)Ti(\eta^4-1,3\text{-pentadiene})$.

16. The process of Claim 9 wherein the catalysts are $[N\text{-}(1,1\text{-dimethylethyl})\text{-}1,1\text{-dimethyl-1-[1,2,3,4,5-}\eta\text{]-}3,4\text{-diphenyl-2,4-cyclopentadienyl-1-yl}]silanaminato(2)\text{-}\kappa N\text{-}15\text{-dimethyl-titanium}$ and $(C_5Me_4SiMe_2N^tBu)Ti(\eta^4-1,3\text{-pentadiene})$.

17. The process of Claim 9 wherein the catalysts are $[N\text{-}(1,1\text{-dimethylethyl})\text{-}1,1\text{-dimethyl-1-[1,2,3,4,5-}\eta\text{]-}3,4\text{-diphenyl-2,4-cyclopentadienyl-1-yl}]silanaminato(2)\text{-}\kappa N\text{-}20\text{-dimethyl-titanium}$ and $(1H\text{-cyclopenta}[1]\text{-phenanthrene-2-yl})dimethyl(t\text{-butylamido})silanetitanium dimethyl$.

18. An ethylene interpolymer composition of Claim 1 produced by a process, comprising:

- 5 a) contacting one or more olefinic monomers in the presence of at least a high molecular weight catalyst having a reactivity ratio r_1^H and at least a low molecular weight catalyst having a reactivity ratio r_1^L in a single reactor; and
- b) effectuating the polymerization of the olefinic monomers in the reactor to obtain an olefin polymer; and
- 10 c) each of r_1^H and r_1^L is about 1 to about 200, and r_1^H/r_1^L is between 0.03 to 30; and/or
- d) the high molecular weight catalyst is capable of producing a polymer with a high molecular weight M_{wH} from the monomers under selected polymerization conditions, and the low molecular weight catalyst is capable of producing a
- 15 polymer with a low molecular weight M_{wL} from the same monomers under substantially the same polymerization conditions, where M_{wH}/M_{wL} is from 1 to 20.

19. The ethylene interpolymer of Claim 1 that contains the residue of at least two catalysts, a first catalyst having a reactivity ratio r_1^H and a second catalyst having a

20 reactivity ratio r_1^L and wherein each of r_1^H and r_1^L independently is a number from 1 to 200, and r_1^H/r_1^L is a number from 0.03 to 30.

20. The ethylene interpolymer composition of Claim 19 characterized by having a r_1^H/r_1^L that is a number greater than 1.